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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

DAVIS, GEORGE B

ART UNIT PAPER NUMBER

2129

DATE MAILED: 11/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/921,993	Applicant(s) SCARBOROUGH ET AL.	
	Examiner George Davis	Art Unit 2129	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 September 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,5-12,15,17,21-23,25-30,32-34,37-41 and 43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-12,15,17,21-23,25-30,32-34,37-41 and 43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>20050928</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claim 42 been renumbered as claim 43.

Claim Objections

2. Claims 1, 2 and 5-12, 25-30, 32-34 and 37-41 are objected to because of the following informalities:

Claim 1, line 4, delete "from a plurality of applicants,".

Claim 1, line 4, delete "the" and insert - - a plurality of - -.

Claim 2, line 5, delete "from a plurality of applicants,".

Claim 2, line 5, delete "the" and insert - - a plurality of - -.

Claim 25, line 4, after "applicant:" insert - - and - -.

Claim 37, last line, delete "wherein the model is an artificial intelligence-based model".

Claim 37, line 2, after "predictive" insert - - artificial intelligence-based - -.

Claim 37, line 4, after "applicant:" insert - - and - -

Claim 37, line 6, delete "," and insert - - , - -.

Claim 37, line 10, delete "; and" and insert - - . - -.

Art Unit: 2129

Claim 38, line 14, delete “,” and insert - - , - -.

Claim 38, line 18, delete “from a plurality of applicants,”.

Claim 38, line 18, delete “the” and insert - - a plurality of - -.

Claim 39, line 11, delete “,” and insert - - , - -.

Claim 39, line 15, delete “from a plurality of applicants,”.

Claim 39, line 15, delete “the” and insert - - a plurality of - -.

Claim 41, line 11, delete “,” and insert - - , - -.

Claim 41, line 12, “claim 25” should be replace by the claimed language.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 38 and 39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then

Art Unit: 2129

narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 38, lines 1-17 recites the broad recitation means steps, and claim 38, lines 17-27 also recites method steps which is the narrower statement of the range/limitation. Claim 39, lines 1-14 recites the broad recitation means steps, and claim 39, lines 14-24 also recites method steps which is the narrower statement of the range/limitation.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 5-12, 15, 21-23, 25-30, 32-34, 37-41 and 43 are rejected under 35 U.S.C. 102(b) as being anticipated by Kirby et al, "An Analysis of Applying Neural Networks for Employee Selection",

http://is.lse.ac.uk/support/AMCIS/AMCIS1998/pdffiles/papers/T02_11.pdf, 1998.

As per claim 1, Kirby discloses electronically collecting pre-hire information from the a plurality of applicants (data collecting during interview, see page 3, line 1)

Art Unit: 2129

collecting post-hire information for the applicants based on job performance of the applicants after hire (collecting performance appraisal data and historical data, see page 3, lines 1 and 2) and from the pre-hire information and the post-hire information, generating an artificial intelligence-based predictive model operable to generate one or more job performance criteria predictors based on input pre-hire information from new applicants (Si is neural predictor for job performance that maps interview data with performance appraisal data, see page 3, lines 2-9).

As per claim 2, Kirby discloses a computer-readable medium (firms stored their historical or interview data in computer readable medium, see page 3, lines 1 and 2), electronically collecting pre-hire information from the a plurality of applicants (data collecting during interview, see page 3, line 1), collecting post-hire information for the applicants based on job performance of the applicants after hire (collecting performance appraisal data and historical data, see page 3, lines 1 and 2) and from the pre-hire information and the post-hire information, generating an artificial intelligence-based predictive model operable to generate one or more job performance criteria predictions based on input pre-hire information from new applicants (Si is neural predictor for job performance that maps interview data with performance appraisal data, see page 3, lines 2-9).

As per claim 5, Kirby discloses limiting the applicants for the model to those with a particular occupation (neural network model can predict any type of occupation, see page 3, lines 8-11) and constructing the model as an occupationally specialized model (this neural network can be labeled as neural network that can predict for example a

computer programmer job, see page 3, lines 8-11).

As per claim 6, Kirby discloses the model accepts one or more inputs (inputs can be used to train neural network, see page 3, line 2), identifying in the pre-hire information one or more characteristics that are ineffective predictors (predictors as inputs or outputs can be noisy, see 2, lines 24 and 25) and omitting the ineffective predictors as inputs to the model (neural network can decide success and failure of outcome and a person can remove data that cause the neural network failure, see page 3, lines 18 and 19).

As per claim 7, Kirby discloses the pre-hire information comprises one or more characteristics (data collected from interviewing an applicant contains many characteristics, see page 3, lines 1 and 2), identifying in the pre-hire information one or more characteristics that are ineffective predictors (data that are noisy are recognize by neural network during training, page 3, lines 2 and 3 and page 2, lines 7-9) and providing an indication that the characteristics no longer need to be collected (outcome from neural network is based on what is available from interview data and historical data not from an updated interview data and historical data, see page 3, lines 1-4).

As per claim 8, Kirby discloses a predictor indicating whether a job candidate will be voluntarily terminated (not selecting a job candidate is the same as terminating the candidate, see page 3, line 18).

As per claim 9, Kirby discloses job performance criteria predictors comprise a predictor indicating whether a job candidate will be eligible for rehire after termination (selection and failure of a candidate in relation to those who come before is an

evaluation that can indicate if this candidate can be hire or not, see page 3, lines 16-19).

As per claim 10, Kirby discloses the pre-hire information comprises one or more characteristics (data collected from interviewing an applicant contains many characteristics, see page 3, lines 1 and 2), identifying in the pre-hire information one or more characteristics that are ineffective predictors (data that are noisy are recognize by neural network during training, page 3, lines 2 and 3 and page 2, lines 7-9) and responsive to identifying the ineffective predictors, collecting new pre-hire information not including the ineffective predictors (interviewing an applicant can result in new collection of success and failure data, see page 3, lines 18) and building a refined model based on the new pre-hire information (neural network can predict performance of new candidate, see 3, line 3).

As per claim 11, Kirby discloses adding one or more new characteristics to be collected when collecting the new pre-hire information (characteristics of an applicant are not limited and could be added during interview because the interview is evaluated, see page 3, line 1 and 8-11).

As per claim 12, Kirby discloses evaluating the effectiveness of the new characteristics (evaluating an interview situation is going be different from person to person, see page 3, line 1).

As per claim 15, Kirby discloses method for constructing an artificial intelligence-based employment selection process based on pre-hire information comprising personal employee characteristics and post-hire information comprising employee job performance observation information (neural networks that select employee from

Art Unit: 2129

interview data and historical, data, see page 3, lines 1-4), generating a plurality of predictive artificial intelligence models based on the pre-hire and post-hire information (predictive models are neural networks, see page 2, line 7), wherein at least two of the artificial intelligence models are of different types (neural networks can be different, therefore, two types of neural networks can be considered two different types of artificial intelligence models), testing effectiveness of the models to select an effective model (neural network can work relatively well in employee selection, see page 2, lines 7 and 8) and applying the effective model to predict post-hire information not yet observed (applying the type which can predict post hire information, see page 3, lines 3-6).

As per claim 21, Kirby discloses identifying at least one of the models as exhibiting impermissible bias (from outcome of a neural network a person can judge if this type of neural network is bias or not and since this article recites neural networks, we can select at least one type that does work fine with the input data and exhibit no bias, see title and page 2, line 7) and avoiding use of the models exhibiting impermissible bias (from outcome of a neural network a person can judge if this type of neural network is bias or not and since this article recites neural networks, we can select at least one type that does work fine with the input data and exhibit no bias, see title and page 2, line 7).

As per claim 22, Kirby discloses the impermissible bias is against a protected group of persons (no bias was exhibited, see page 2, lines 7 and 8).

As per claim 23, Kirby discloses refining an artificial-intelligence based employee performance selection system (see page 3, line 1), collecting information via an

Art Unit: 2129

electronic device presenting a set of questions to employment candidates (data from interview are collected to be mapped later by neural network, see page 3, lines 2 and 3), wherein the questions are stored in a computer-readable medium (firms stored their historical or interview data in computer readable medium, see page 3, lines 1 and 2), testing effectiveness of at least one of the questions in predicting the post-hire information (predicting future performance, see page 3, line 3) and responsive to determining the question is ineffective (if a question is noisy, it is failure, see page 3, line 18), deleting the question from the computer-readable medium (neural network can decide success and failure of outcome and a person can remove data that cause the neural network failure, see page 3, lines 18 and 19).

As per claim 25, Kirby discloses inputs for accepting one or more characteristics based on pre-hire information for a job applicant (performance of applicant at interview, see page 3, line 2), one or more predictive outputs indicating one or more predicted job effectiveness criteria based on the inputs (neural network can predict future performance, see page 3, line 4), wherein the predictive model is an artificial intelligence-based model constructed from pre-hire data electronically collected from a plurality of employees and post-hire data, and the model generates its predictive outputs based on the similarity of the inputs to pre-hire data collected for the plurality of employees and their respective post-hire data (see page 3, page 1-7).

As per claim 26, Kirby discloses the predictive model comprises a predictive output indicating a rank for the job applicant (S_i is the score of a applicant performance, see page 3, lines 4-7).

As per claim 27, Kirby discloses the rank is relative to other applicants (see performance score equation, page 3, line 5).

As per claim 28, Kirby discloses the rank is relative to the plurality of employees (see performance score equation, page 3, line 5).

As per claim 29, Kirby discloses the predictive model comprises a predictive output indicating probability of group membership for the job applicant (see equation on page 3, line 5).

As per claim 30, Kirby discloses the predictive model comprises a predictive output indicating predicted tenure for the job applicant (every position has its own characteristic, see page 3, lines 9-11).

As per claim 32, Kirby discloses the predictive model comprises a predictive output indicating predicted number of accidents for the job applicant (the neural network can predict many performance outcomes, see page 3, line 10).

As per claim 33, Kirby discloses the predictive model comprises a predictive output indicating whether the applicant will be involuntarily terminated (not selecting a job candidate is the same as terminating the candidate, see page 3, line 18).

As per claim 34, Kirby discloses the predictive model comprises a predictive output indicating whether the applicant will be eligible for rehire after termination (selection and failure of a candidate in relation to those who come before is an evaluation that can indicate if this candidate can be hire or not, see page 3, lines 16-19).

As per claim 37, Kirby discloses a computer-readable medium (firms stored their historical or interview data in computer readable medium, see page 3, lines 1 and 2), a

Art Unit: 2129

refined predictive artificial intelligence-based model (see page 3, line 3), inputs for accepting one or more characteristics based on pre-hire information for a job applicant (interviewing data is collected so can be mapped by neural network, see page 3, lines 2 and 3), one or more predictive outputs indicating one or more predicted job effectiveness criteria based on the inputs (predicting future performance, see page 3, lines 2 and 3), wherein the predictive model is constructed from pre-hire data electronically collected from a plurality of employees and post-hire data (mapping the performance data to interview data, see page 3, lines 2 and 3) and wherein the pre-hire data is based on a question set refined by having identified and removed one or more questions as ineffective (neural network can decide success and failure of outcome and a person can remove data that cause the neural network failure, see page 3, lines 18 and 19).

As per claim 38, Kirby discloses electronic data interrogator means for presenting a first set of a plurality of means for questioning to the individual (see page 3, line 1), electronic answer capturer means for electronically storing answers by the individual to at least a selected plurality of the first set of means for questioning presented to the individual (interview data are collected, see page 3, lines 2 and 3), electronic predictor means responsive to the stored answers and for predicting at least one post-hire outcome if the individual were to be employed by the employer, the predictor providing a prediction of the outcome based upon correlations of the stored answers with answers to sets of means for questioning by other individuals for which post-hire information has been collected (neural network for predicting outcome after

Art Unit: 2129

mapping interview data and historical data of current employee, see page 3, lines 1-7), electronic results provider means for providing an output indicative of the outcome to assist in determining the suitability of the individual for employment by the employer (neural network predict success and failure rate, see page 3, lines 17-19), electronically collecting pre-hire information from the applicants (data collecting from interviewing applicant, see page 3, lines 1 and 2), collecting post-hire information for the applicants based on job performance of the applicants after hire (data collecting from current employee as historical database, see page 3, lines 1 and 2) and from the pre-hire information and the post-hire information, generating an artificial intelligence-based predictive model in a computer-readable medium, wherein the artificial intelligence-based predictive model is operable to generate one or more job performance criteria predictions based on input pre-hire information from new applicants, whereby the one or more job performance criteria predictions are usable as a basis for a hiring recommendation or other employee selection information (predicting outcome by mapping interview data and appraisal data, see page 3, lines 1-7).

As per claim 39, Kirby discloses means for presenting a first set of a plurality of means for questioning to the individual (see page 3, line 1), means for electronically storing answers by the individual to at least a selected plurality of the first set of means for questioning presented to the individual (interview data are collected, see page 3, lines 2 and 3), means responsive to the stored answers and for predicting at least one post-hire outcome if the individual were to be employed by the employer, the predictor providing a prediction of the outcome based upon correlations of the stored answers

Art Unit: 2129

with answers to sets of means for questioning by other individuals for which post-hire information has been collected (neural network for predicting outcome after mapping interview data and historical data of current employee, see page 3, lines 1-7) and means for providing an output indicative of the outcome to assist in determining the suitability of the individual for employment by the employer (neural network predict success and failure rate, see page 3, lines 17-19), electronically collecting pre-hire information from the applicants (data collecting from interviewing applicant, see page 3, lines 1 and 2), collecting post-hire information for the applicants based on job performance of the applicants after hire (data collecting from current employee as historical database, see page 3, lines 1 and 2) and from the pre-hire information and the post-hire information, generating an artificial intelligence-based predictive model in a computer-readable medium, wherein the artificial intelligence-based predictive model is operable to generate one or more job performance criteria predictions based on input pre-hire information from new applicants, whereby the one or more job performance criteria predictions are usable as a basis for a hiring recommendation or other employee selection information (predicting outcome by mapping interview data and appraisal data, see page 3, lines 1-7).

As per claim 40, Kirby discloses electronic data interrogator means for presenting a first set of a plurality of means for questioning to the individual (see page 3, line 1), electronic answer capturer means for electronically storing answers by the individual to at least a selected plurality of the first set of means for questioning presented to the individual (interview data are collected, see page 3, lines 2 and 3), electronic predictor

means responsive to the stored answers and for predicting at least one post-hire outcome if the individual were to be employed by the employer, the predictor providing a prediction of the outcome based upon correlations of the stored answers with answers to sets of means for questioning by other individuals for which post-hire information has been collected (neural network for predicting outcome after mapping interview data and historical data of current employee, see page 3, lines 1-7) and electronic results provider means for providing an output indicative of the outcome to assist in determining the suitability of the individual for employment by the employer (predicting outcome can be failure or success, see page 3, lines 18 and 19).

As per claim 41, Kirby discloses means for presenting a first set of a plurality of means for questioning to the individual (see page 3, line 1) means for electronically storing answers by the individual to at least a selected plurality of the first set of means for questioning presented to the individual (interview data are collected, see page 3, lines 2 and 3), means responsive to the stored answers and for predicting at least one post-hire outcome if the individual were to be employed by the employer, the predictor providing a prediction of the outcome based upon correlations of the stored answers with answers to sets of means for questioning by other individuals for which post-hire information has been collected (neural network for predicting outcome after mapping interview data and historical data of current employee, see page 3, lines 1-7), means for providing an output indicative of the outcome to assist in determining the suitability of the individual for employment by the employer (predicting outcome can be failure or

Art Unit: 2129

success, see page 3, lines 18 and 19) and wherein the apparatus comprises the predictive model of claim 25 (see citation in claim 25).

As per claim 43, Kirby discloses the ineffective questions are identified via an information transfer technique (ineffective questions can be identified since the neural network predicting outcomes are either failure or success, see page 3, lines 18 and 19).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kirby et al, "An Analysis of Applying Neural Networks for Employee Selection", http://is.lse.ac.uk/support/AMCIS/AMCIS1998/pdffiles/papers/T02_11.pdf, 1998 in view of Kemp H. R., "Knowledge-Based Simulation for Teaching", IEEE Proceedings of the 1st New Zealand International Stream Conference on Artificial Neural Networks and Expert Systems, Nov. 1993.

Kerby does disclose at least one of models is an expert system. However, Kemp discloses at least one of models is an expert system (abstract, line 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use expert system as one of the artificial intelligence models because expert system is good correlation tool.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Davis whose telephone number is (571) 272-3683. The examiner can normally be reached on Monday through Friday from 10:00 am to 6:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Vincent, can be reached on (571) 272-3080. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-3800.

November 10, 2005

A handwritten signature in black ink, appearing to read 'G. B. Davis', with a large, sweeping loop at the end.

GEORGE B. DAVIS

PRIMARY PATENT EXAMINER